

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



B2

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : C12N 15/00, A01K 67/027, C07K 14/81, C12N 5/06		A3	(11) International Publication Number: WO 00/25578 (43) International Publication Date: 11 May 2000 (11.05.00)
(21) International Application Number: PCT/US99/25786 (22) International Filing Date: 2 November 1999 (02.11.99) (30) Priority Data: Not furnished 2 November 1998 (02.11.98) US 60/131,061 26 April 1999 (26.04.99) US 60/131,328 26 April 1999 (26.04.99) US 60/149,317 17 August 1999 (17.08.99) US (71) Applicant (for all designated States except US): TRUSTEES OF TUFTS COLLEGE [US/US]; Medford, MA 02155 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): BAGUISI, Alexander, B. [PH/US]; Nine Millbury Street, Grafton, MA 01519 (US). OVERSTROM, Eric, W. [US/US]; 32 Blanchard Road, Grafton, MA 01519 (US). (74) Agents: PIERCE, N., Scott et al.; Hamilton, Brook, Smith & Reynolds, P.C., Two Militia Drive, Lexington, MA 02421 (US).			(81) Designated States: JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report. (88) Date of publication of the international search report: 16 November 2000 (16.11.00)
(54) Title: METHODS FOR CLONING ANIMALS			
(57) Abstract The present invention pertains to methods for cloning animals. In particular, the invention includes methods of cloning an animal by combining a genome from an activated donor cell with an activated enucleated oocyte to thereby obtain a nuclear transfer embryo, and impregnating an animal with the nuclear transfer embryo in conditions suitable for gestation of a cloned animal. The invention further relates to methods of chemically enucleating an oocyte having a meiotic spindle apparatus by exposing the oocyte with a compound that destabilizes the meiotic spindle apparatus.			

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/25786

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/00 A01K67/027 C07K14/81 C12N5/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61K A01K C07K C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 01163 A (UNIV MASSACHUSETTS) 14 January 1999 (1999-01-14) page 11, line 23 -page 12, line 21 page 16, line 20 -page 19, line 7; claims 1-13,15-22	1-5,7-9, 11-17, 19-26, 28-30
A	--- CIBELLI J B ET AL: "CLONED TRANSGENIC CALVES PRODUCED FROM NONQUIESCENT FETAL FIBROBLASTS" SCIENCE,US,AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,, vol. 280, 22 May 1998 (1998-05-22), pages 1256-1258, XP000786003 ISSN: 0036-8075 the whole document --- -/-	1-5,7



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

24 August 2000

Date of mailing of the international search report

31.08.00

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Chambonnet, F

INTERNATIONAL SEARCH REPORT

Intern 1st Application No

PCT/US 99/25786

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ROBL J M ET AL: "SOMATIC CELL NUCLEAR TRANSPLANTATION IN CATTLE" ANNUAL MEETING SOC. STUDY REPROD., vol. 58, 8 August 1998 (1998-08-08), page 25 XP000791151 the whole document ---	1
A	WO 96 26268 A (GENZYME TRANSGENICS CORP) 29 August 1996 (1996-08-29) the whole document ---	1
P,X	BAGUISI A, ET AL.: "Production of goats by somatic cell nuclear transfer." NAT BIOTECHNOL, vol. 17, no. 5, May 1999 (1999-05), pages 456-461, XP000891364 page 457, column 1, paragraph 2 page 459, column 1, paragraph 3 -column 2, paragraph 4 page 460, column 1, paragraph 2 page 460, column 2, paragraph 1 ---	1-4, 6-19, 21-30
A	page 460, column 1, paragraph 2 page 460, column 2, paragraph 1 ---	31
A	BORDIGNON V ET AL: "TELOPHASE ENUCLEATION: AN IMPROVED METHOD TO PREPARE RECIPIENT CYTOPLASTS FOR USE IN BOVINE NUCLEAR TRANSFER" MOLECULAR REPRODUCTION AND DEVELOPMENT,US,NEW YORK, NY, vol. 49, January 1998 (1998-01), pages 29-36, XP000910821 cited in the application the whole document ---	31
A	WO 98 29532 A (PEURA TEIJA ;UNIV MONASH (AU)) 9 July 1998 (1998-07-09) the whole document ---	31
A	WO 95 03398 A (UNIV MONASH ;TATHAM BRENDAN GEORGE (AU)) 2 February 1995 (1995-02-02) the whole document ---	31
P,A	US 5 952 222 A (ROSENKRANS JR CHARLES F ET AL) 14 September 1999 (1999-09-14) the whole document -----	31

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 99/25786

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

As far as claims 8 to 30 are directed to a method of treatment of the non human animal body, the search has been carried out and based on the alleged effects of the composition.
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-30

Methods for cloning an animal or producing a transgenic animal comprising the steps of:

- a) combining a genome from an activated donor cell with an activated, enucleated oocyte to thereby form a nuclear transfer embryo; and;
- b) impregnating an animal with the nuclear transfer embryo in conditions suitable for gestation of the cloned animal.

2. Claims: 31-38

A method of enucleating an oocyte having a meiotic spindle apparatus, comprising exposing the oocyte with at least one compound that destabilizes the meiotic spindle apparatus;

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/25786

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9901163 A	14-01-1999	AU 8154398 A EP 1017422 A	25-01-1999 12-07-2000
-----	-----	-----	-----
WO 9626268 A	29-08-1996	US 5843705 A AU 695249 B AU 5026296 A CA 2197675 A EP 0773992 A	01-12-1998 13-08-1998 11-09-1996 29-08-1996 21-05-1997
-----	-----	-----	-----
WO 9829532 A	09-07-1998	AU 7891298 A	31-07-1998
-----	-----	-----	-----
WO 9503398 A	02-02-1995	AU 687422 B AU 7260194 A	26-02-1998 20-02-1995
-----	-----	-----	-----
US 5952222 A	14-09-1999	NONE	
-----	-----	-----	-----